We claim:

1. A process of making a bleached wood pulp comprising:

providing an aqueous slurry of wood pulp;

combining the wood pulp with a bleaching mixture comprising hydrogen peroxide and a magnesium compound selected from the group consisting of magnesium hydroxide, magnesium oxide and mixtures thereof, to form a bleaching pulp mixture; and

maintaining the bleaching pulp mixture at a pH of 8.5 or less for a time sufficient to produce the bleached wood pulp.

2. A process according to claim 1, wherein the bleaching mixture also comprises up to about 0.5 wt. % based on pulp dry mass of a chelating agent.

3. A process according to claim 2, wherein the chelating agent is selected from the group consisting of diethylenetriaminepentaacetic acid, ethylenediaminetetraacetic acid, N-(2-hydroxyethyl) ethylenediaminetriacetic acid, diethylenetriamine pentamethylene phosponic acid, cyclic ethers, and their salts, and mixtures thereof.

4. A process according to claim 3, wherein the chelating agent is diethylenetriaminepentaacetic acid.

5. A process according to claim 1, wherein the bleaching pulp mixture is maintained for a reaction time of up to about 6 hours.

6. A process according to claim 1, wherein the bleaching pulp mixture is heated so as to be maintained at a temperature range of about 120 °F to about 210 °F.

7. A process according to claim 1, wherein the hydrogen peroxide has an initial concentration in the bleaching pulp mixture of up to about 6 wt. %, based on pulp dry mass.

8. A process according to claim 7, wherein the hydrogen peroxide has an initial concentration of about 1 to about 6 wt. % based on pulp dry mass.

9. A process according to claim 1, wherein the magnesium compound has an initial concentration in the bleaching pulp mixture of from about 0.5 wt. % of up to about 5 wt. %, based on pulp dry mass.

10. A process according to claim 9, wherein the magnesium compound has an initial concentration of from about 1 to about 2 wt. % based on pulp dry mass in the bleaching pulp mixture.

11. A process according to claim 1, wherein the magnesium compound contains less than about 250 ppm Mn, less than about 0.15 wt. % Fe, and less than about 250 ppm Cu, based on the equivalent mass of $Mg(OH)_2$.

12. A process according to claim 1, wherein the bleaching pulp mixture has a final pH of about 5.0 to about 8.5.

13. A process according to claim 1, wherein the bleached wood pulp has an ISO brightness of up to about 75 %.

14. A process according to claim 1, wherein the initial ratio of magnesium compound to hydrogen peroxide in said bleaching mixture is about 25 parts to about 75 parts of magnesium compound to about 100 parts of hydrogen peroxide, based on a $Mg(OH)_2$ chemical equivalence.

15. A process according to claim 1, wherein the magnesium compound is a magnesium hydroxide which has a BET surface area of from about 7 to about 15 m^2/g, or a magnesium oxide which has a BET surface area of from about 5 to 200 m^2/g.

16. A process of making a bleached wood pulp comprising:

providing an aqueous slurry of wood pulp;

adding a first chelating agent to said pulp;

providing a bleaching mixture comprising hydrogen peroxide and a magnesium compound selected from the group consisting of magnesium hydroxide, magnesium oxide and mixture thereof;

washing the wood pulp, and optionally dewatering the slurry to form a washed wood pulp;

combining the washed wood pulp with said bleaching mixture to form a bleaching pulp mixture; and

maintaining the bleaching pulp mixture at a pH of about 8.5 or less for a time sufficient to produce the bleached wood pulp.

17. A process according to claim 16, wherein the first chelating agent comprises up to about 0.5 wt. %, based on pulp dry mass, of diethylenetriaminepentaacetic acid, ethylenediaminetetraacetic acid, N-(2-hydroxyethyl) ethylenediaminetriacetic acids, diethylenetriamine pentamethylene phosphonic acid, cyclic ethers, and their salts.

18. A process according to claim 16, wherein the bleaching mixture comprises up to about 0.5 wt. %, based on pulp dry mass, of a second chelating agent, said second chelating agent being added at a different point in the process than said first chelating agent.

19. A process according to claim 18, wherein said first chelating agent is added to said pulp, and said second chelating agent is added to said bleaching pulp mixture or to said bleaching mixture prior to mixing with said pulp.

20. A process according to claim 19, wherein the second chelating agent is selected from the group of diethylenetriaminepentaacetic, ethylenediaminetetraacetic acid, N-(2-hydroxyethyl) ethylenediaminetriacetic acids, diethylenetriamine pentamethylene phosphonic acid, cyclic ethers, and their salts, and mixtures thereof.

21. A process according to claim 20, wherein the first and second chelating agents are diethylenetriaminepentaacetic acid.

22. A process according to claim 16, wherein the bleaching pulp mixture is maintained for a reaction time of up to about 6 hours.

23. A process according to claim 16, wherein the bleaching pulp mixture is heated so as to be maintained at a temperature range of about 120 °F to about 210 °F.

24. A process according to claim 16, wherein the hydrogen peroxide has an initial concentration in the bleaching pulp mixture of up to about 6 wt. %, based on pulp dry mass.

25. A process according to claim 24, wherein the hydrogen peroxide has an initial concentration of about 1 to about 6 % based on pulp dry mass.

26. A process according to claim 24, wherein the magnesium compound has an initial concentration of about 0.5 to about 5.0 wt. % based on pulp dry mass in the bleaching pulp mixture.

27. A process according to claim 16, wherein the magnesium compound contains less than about 250 ppm Mn, less than about 0.15 wt. % Fe, and less than about 250 ppm Cu, based on the equivalent mass of $Mg(OH)_2$.

28. A process according to claim 16, wherein the bleaching pulp mixture has a final pH of about 5.0 to about 8.5.

29. A process according to claim 16, wherein the bleached wood pulp has an ISO brightness of up to about 75 %.

30. A process according to claim 16, wherein the initial ratio of magnesium compound to hydrogen peroxide in said bleaching mixture is about 25 parts to about 75 parts of magnesium compound to about 100 parts hydrogen peroxide, based on a $Mg(OH)_2$ chemical equivalence.

31. A process according to claim 16, wherein the magnesium compound is a magnesium hydroxide which has a BET surface area of from about 7 to about 15 m^2/g, or a magnesium oxide which has a BET surface area of from about 5 to 200 m^2/g.

32. A process of making a bleached wood pulp comprising:

providing an aqueous slurry of wood pulp;

combining the wood pulp with a bleaching mixture comprising hydrogen peroxide and a magnesium compound selected from the group consisting of magnesium hydroxide, magnesium oxide, and mixtures thereof, and with a recycled filtrate comprising residual hydrogen peroxide, optionally fresh hydrogen peroxide, to form a bleaching pulp mixture;

maintaining the bleaching pulp mixture at a pH of about 8.5 or less for a time sufficient to produce the bleached wood pulp;

separating the bleached wood pulp from a filtrate comprising water and residual hydrogen peroxide; and

recycling at least a portion of said filtrate as at least a portion of said bleaching mixture.

33. A process according to claim 32, wherein the bleaching mixture also comprises up to 0.5 wt. % of chelating agent, based on pulp dry mass.

34. A process according to claim 33, wherein the chelating agent is selected from the group consisting of diethylenetriaminepentaacetic acid, ethylenediaminetetraacetic acid, N-(2-hydroxethyl) ethylenediaminetriacetic acid, diethylentriamine pentamethylene phosphonic acid, cyclic ethers, their salts, and mixtures thereof.

35. A process according to claim 34, wherein the chelating agent is diethylenetriaminepentaacetic acid.

36. A process according to claim 32, wherein the bleaching pulp mixture is maintained for a reaction time of up to about 6 hours.

37. A process according to claim 32, wherein the bleaching pulp mixture is heated so as to be maintained at a temperature range of about 120 °F to about 210 °F.

38. A process according to claim 32, wherein the hydrogen peroxide has an initial concentration in the bleaching pulp mixture of up to about 6 wt. %, based on pulp dry mass.

39. A process according to claim 38, wherein the hydrogen peroxide has an initial concentration of about 1 to about 6 wt. % based on pulp dry mass.

40. A process according to claim 32, wherein the magnesium compound has an initial concentration in the bleaching pulp mixture of from about 0.5 wt. % up to about 5 wt. %, based on pulp dry mass.

41. A process according to claim 40, wherein the magnesium compound has an initial concentration of from about 1 to about 2 wt. % based on pulp dry mass.

42. A process according to claim 32, wherein the magnesium compound contains less than about 250 ppm Mn, less than about 0.15 wt. % Fe, and less than about 250 ppm Cu, based on the equivalent mass of $Mg(OH)_2$.

43. A process according to claim 32, wherein the bleaching pulp mixture has a final pH of about 5.0 to about 8.5.

44. A process according to claim 32, wherein the bleached wood pulp has an ISO brightness of up to about 75 %.

45. A process according to claim 32, wherein the initial ratio of magnesium compound to hydrogen peroxide in said bleaching mixture is about 25 parts to about 75 parts of magnesium compound per about 100 parts of hydrogen peroxide, based on a $Mg(OH)_2$ chemical equivalence.

46. A process according to claim 32, wherein the magnesium compound is a magnesium hydroxide which has a BET surface area of from about 7 to about 15 m^2/g, or a magnesium oxide which has a BET surface area of from about 5 to 200 m^2/g.

47. A process according to claim 32, wherein fresh hydrogen peroxide is added to said filtrate prior to recycle as bleaching mixture.

48. A process according to claim 32, wherein at least a portion of said filtrate and said bleaching mixture are combined prior to combining with said wood pulp.